

CLAIMS

1. A network node comprising:
 - a first network interface;
 - a cross connect switch coupled to the first network interface; and
 - a first multi-medium network interface coupled to the cross-connect switch.
2. The network node of Claim 1, wherein the first-multi medium network interface comprises:
 - an optical interface; and
 - a first wireless interface.
3. The network node of Claim 2, wherein the first wireless interface is a RF interface.
4. The network node of Claim 2, wherein the first wireless interface is a free-space optics interface.
5. The network node of Claim 2, wherein the first multi-medium network interface further comprises a second wireless interface.
6. The network node of Claim 5, wherein the first wireless interface is an RF interface and the second wireless interface is a free-space optics interface.
7. The network node of Claim 1, further comprising a TDM user interface coupled to the cross-connect switch and configured for data using time-division multiplexing.

8. The network node of Claim 7, wherein the TDM user interface comprises an optical interface.

9. The network node of Claim 7, wherein the TDM user interface comprises a wireless interface.

10. The network node of Claim 7, wherein the TDM user interface comprises a copper wire interface.

11. The network node of Claim 1, wherein the cross connect switch comprises:

a first TDM Framer/Deframer coupled to the first network interface and configured to deframe a first TDM frame from the first network interface; and

a second TDM Framer/Deframer coupled to the first multi-medium network interface and configured to form a second TDM data frame.

12. The network node of Claim 1 wherein the cross connect unit is a Packet/TDM cross connect unit configured to process TDM data and packet data.

13. The network node of Claim 12, further comprising a packet user interface coupled to the cross-connect switch and configured for packet based data.

14. The network node of Claim 13, wherein the Packet/TDM cross connect unit further comprises:

a packet switch coupled to the packet user interface;
and

a TDM switch coupled to the TDM user interface.

15. The network node of Claim 12, wherein the Packet/TDM cross connect switch, further comprises:

a first TDM Framer/Deframer coupled to the first network interface and configured to deframe a first TDM frame from the first network interface; and

a second TDM Framer/Deframer coupled to the a first multi-medium network and configured to form a second TDM data frame.

16. The network node of Claim 15, further comprising a first dynamic multiplexer/demultiplexer coupled to the first TDM Framer/Deframer and configured to separate data from the first TDM data frame into TDM data and packet data.

17. The network node of Claim 16, wherein the Packet/TDM cross connect switch further comprises a TDM switch coupled to the first dynamic multiplexer/demultiplexer and configured to receive a TDM THROUGH payload and a TDM DROP payload from the first dynamic multiplexer/demultiplexer.

18. The network node of Claim 17, wherein the TDM switch is configured to receive a TDM ADD payload from the TDM user interface.

19. The network node of Claim 18, wherein the TDM switch is configured to:

send the TDM THROUGH payload and the TDM ADD payload to a second dynamic multiplexer/demultiplexer; and

send the TDM DROP payload to the TDM user interface.

20. The network node of Claim 19, wherein the Packet/TDM cross connect switch further comprises a packet switch coupled to the first dynamic multiplexer/demultiplexer.

21. The network node of Claim 16, further comprising a packet switch coupled to the first dynamic multiplexer/demultiplexer and configured to receive a packet THROUGH payload and a packet DROP payload from the first dynamic multiplexer/demultiplexer.

22. The network node of Claim 21, further comprising a packet user interface and wherein the packet switch is configured to receive a packet ADD payload from the packet user interface.

23. The network node of Claim 22, wherein the packet switch is configured to:

send the packet THROUGH payload and the packet ADD payload to a second dynamic multiplexer/demultiplexer; and
send the packet DROP payload to the packet user interface.

24. The network node of Claim 1, wherein the multi-medium network interface comprises:

a physical layer interface coupled to the cross connect switch;

an optical transceiver coupled to the physical layer interface and configured to convert an outgoing data stream from an outgoing electrical signal to an outgoing optical signal;

a media abstraction unit coupled to the optical transceiver and configured to reframe the outgoing data

stream from the outgoing optical signal to a second outgoing electrical signal suited for wireless transmission; and
a first wireless unit coupled to the media abstraction unit and configured to convert the second outgoing electrical signal to a first outgoing wireless signal.

25. The network node of Claim 24, wherein the first wireless unit is also configured to convert an incoming wireless signal to a first incoming electrical signal.

26. The network node of Claim 25, wherein the media abstraction unit is configured to convert the first incoming electrical signal to an incoming optical signal.

27. The network node of Claim 26, wherein the optical transceiver is also configured to convert an incoming optical signal to a second incoming electrical signal.

28. The network node of Claim 27, further comprising a second wireless unit coupled to the media abstraction unit configured to convert the second outgoing electrical signal into a second outgoing wireless signal.

29. The network node of Claim 28, wherein the first wireless unit is a RF wireless unit and the second wireless unit is a free-space optics unit.

30. The network node of Claim 24, wherein the media abstraction unit comprises a link quality management unit configured to adapt one or more parameters of the multi-medium network interface to provide more reliable data transmission.

31. The network node of Claim 30, wherein the link quality management unit comprises a transmission power control unit.

32. The network node of Claim 31, wherein the transmission power control unit 1310 is configured to adapt the transmission power of the multi-medium network interface.

33. The network node of Claim 30, wherein the link quality management unit comprises a modulation control unit.

34. The network node of Claim 33, wherein the modulation control unit comprises a signal quality detector configured to measure a signal quality of an incoming data stream.

35. The network node of Claim 33, wherein the modulation control unit is configured to adapt the modulation of an outgoing data stream.

36. The network node of Claim 30, wherein the link quality management unit further comprises:

an error correction code encoding unit configured to add redundancy to an outgoing data stream; and

an ECC level control unit coupled to the error correction code encoding unit.

37. The network node of Claim 36, wherein the ECC level control unit controls the amount of redundancy added by the error correction code encoding unit.

38. The network node of Claim 30, wherein the link quality management unit further comprises an error correction code

decoding unit configured to remove redundancy of an error correction code on an incoming data stream.

39. The network node of Claim 1, wherein the first network interface is a second multi-medium network interface.

40. The network node of Claim 1, further comprising a second multi-medium network interface coupled to the cross connect switch.

41. The network node of Claim 40, further comprising a third multi-medium network interface coupled to the cross connect switch.